

STUDIES IN AUSTRALIAN FISHES.

No. 7.*

BY

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(Plates xxi.-xxiv. and Figure 1.)

Family PLOTOSIDÆ.

Genus EURISTHMUS, *Ogilby*.

Euristhmus, Ogilby, Proc. Linn. Soc. N.S.Wales, xxiv., 1, 1899, p. 154
(*Plotosus elongatus*, Castelnau).

This genus is distinguished from *Cuidoqlanis*, Günther, by the wide isthmus which separates the gill-membranes; its axillary pore is also much smaller than that of *C. megastomus*.

EURISTHMUS LEPTURUS, *Günther*.

Long-tailed Catfish.

(Plate xxi., fig. 1).

Cuidoqlanis lepturus, Günther, Brit. Mus. Cat. Fish., v., 1864, p. 28.

D. i/4; P. i/11; V. 12. Depth before the ventral fins 1.3 in the length of the head, and 8.5 in the length to the hypural joint; head 6.3 in the same. Head and body 2.1 in the length of the tail. Eye 3.07 in its distance from the end of the snout, and 2.3 in the interocular space, which is 3.6 in the head. Dorsal spine 2.5, pectoral spine 3.0 in the head. Dorsal fin 2.1, pectoral fin 1.9, and ventral fin 2.7 in the head.

General form slender, the tail elongate. Head somewhat depressed, its breadth 1.2 in its length. Nasal barbels about four-fifths as long as the head, and longer than the maxillary pair. Two pairs of mandibular barbels, the outermost of which are longest. Snout rounded, projecting far beyond the mandible. Lips thick and plicate, the lower forming a free fold near each angle of the mouth which is narrower than the interspace between them; posterior angle of the mouth not reaching the vertical of the anterior margin of the eye. Anterior nostril a simple opening near the upper lip, the posterior slit-like and opening on the outer base of the nasal barbel. Surface of the head with numerous minute pores. Preopercular margin completely hidden beneath the skin, the opercular edge indicated by a fold. Gill-openings wide but separated by a broad interspace on the isthmus which is almost as wide as the interocular space.

* For No. 6, see "Records," xiii., pt. 2, 1920, p. 41.

A small group of six or seven stout conical teeth on each side of the premaxillary symphysis, the anterior of which are largest. A row of strong conical teeth around the mandible followed by a band of smaller ones. A wide and somewhat crescentic band of molariform teeth on the vomer.

Dorsal spine inserted a short distance behind the head, its hinder edge serrated; the fin is about half as long as high and somewhat pointed, and almost reaches the origin of the second dorsal when laid back. Second dorsal less than half as high as the first, decreasing backwards, and united with the tail. Anal similar to the second dorsal. Ventrals originating a trifle behind the vertical of the commencement of the second dorsal; their margins are rounded, and they reach the anal origin when laid back. Pectorals rounded, a little longer than the first dorsal; the spine is feebly serrated.

Lateral line commencing in a group of pores on the shoulder and forming a curve above the pectoral, after which it extends along the middle of the body and tail. Axillary pore minute, opening at the anterior end of a glandular area above the base of the pectoral fin. A large dendritic appendage is present behind the vent.

Colour.—Brown above, lighter below, and obscurely mottled with lighter areas on the tail. Soft dorsal and anal fins with darker borders.

Described and figured from a specimen 363 mm. long from the estuary of the Hawkesbury River, New South Wales, which was caught and presented to the Australian Museum by Dr. Mark C. Lidwill. Others are in the collection from the Parramatta River estuary.

Family MONOCENTRIDÆ.

Genus CLEIDOPUS, *De Vis*.

Cleidopus, De Vis, Proc. Linn. Soc. N.S.Wales, vii., 1882, p. 367 (*gloria maris*).

This genus differs from *Monocentris*, Bloch & Schneider, in having a patch of vomerine teeth, a luminous organ on each side of the mandible, and the suborbital bone linear instead of broad.

CLEIDOPUS GLORIA-MARIS, *De Vis*.

(Plate xxiii., fig. 1).

Cleidopus gloria-maris, De Vis, Proc. Linn. Soc. N.S.Wales, vii., 1882, p. 368.

Monocentris gloria-maris, Ogilby, Proc. Linn. Soc. N.S.Wales, xxiv., 1899, p. 163. *Id.*, Waite, Mem. Austr. Mus., iv., 1, 1899, p. 67, pl. viii., figs. 1-2.

This species has been described in detail by Ogilby, and further considered by Waite in the papers quoted above. It is not uncommon in depths of about forty fathoms off the coast near Port Jackson, where it is taken by trawlers. Specimens placed in a tub of water by the fishermen

have been observed to cast a gleam of light ahead from each mandibular luminous organ, which circumstance has earned for the species the popular title of "Port and Starboard Light Fish."

Variation.—Six specimens 145-210 mm. long, from New South Wales and two from Western Australia exhibit variation in the number of scutes, those from the east having fourteen to fifteen in a row from the shoulder to the base of the tail while the western examples have thirteen to fourteen. The dorsal spines of the western specimens are smaller than those of the east, but as the specimens are apparently similar in all structural details, it is probable that they are referable to the one species.

Localities.—New South Wales coast, and Fremantle, Western Australia.

Family MUGILIDÆ.

Genus MUGIL, *Linnaeus*.

Through the kindness of the Director of the Queensland Museum, I have been able to examine the holotypes of some of Ogilby's species of this genus, and to compare them with allied species. The following key indicates their relationship and their principal distinguishing characters.

- a.* An anterior and posterior eyelid.
- b.* 8 anal rays; about 40 scales between operculum and hypural joint *dobula*.
- bb.* 9 anal rays; 29-34 scales between operculum and hypural joint.
- c.* End of mandible exposed when the mouth is closed; pectoral fin shorter than or equal to distance between the opercular margin and the anterior orbital edge. No distinct dark axillary spot.
- d.* About 30 scales between operculum and hypural joint.
- e.* First dorsal spine reaching more than half its distance from base of last dorsal ray *dussumieri*.
- ee.* First dorsal spine not reaching half its distance from base of last dorsal ray. Dorsal and anal fins almost completely covered with scales *tadopsis*.
- cc.* End of mandible almost or entirely hidden below the pre-orbital when the mouth is closed. Pectoral at least as long as the space between opercular edge and anterior margin of orbit. A pronounced dark axillary spot.
- f.* Cheek-scales finely ctenoid; 30-32 scales between operculum and hypural joint. Body-scales without distinct membranous borders. Their surface sculpture being continued to the edge. Dorsal and anal rays not hidden by scales. First dorsal spine nearer the hypural joint than the end of the snout *georgii*.
- ff.* Cheek-scales cycloid; 33-34 scales between the operculum and the hypural joint. Each body-scale with a membranous border which is not sculptured like the surface of the scale. Dorsal and anal rays largely hidden by scales. First dorsal spine nearer the end of the snout than the hypural joint *longimanus*.

MUGIL DUSSUMIERI (*Cur. & Val.*) *Day.*

(Fig. 1).

Mugil dussumieri, Cuvier & Valenciennes, Hist. Nat. Poiss., xi., 1836, p. 147. *Id.*, Day, Fish. India, 1876, p. 352, pl. lxxiv., fig. 2. *Id.*, Stead, Proc. Linn. Soc. N.S.Wales, xxxi., 1906, p. 60, and Add. Fish. Faun. N.S.Wales, 1907, p. 7, and Ed. Fish. N.S.Wales, 1908, p. 42. *Id.*, Weber, Nova Guinea, v., 1907, p. 243.

Mugil nepalensis, Günther, Brit. Mus. Cat. Fish., iii., 1862, p. 424, (*vide* Day).

Mugil stevensi, Ogilby, Ann. Qld. Mus., No. 9, 1908, p. 19.

Characters of the holotype of *M. stevensi*, Ogilby, which is incomplete and in a very imperfect state of preservation. D. iv., i/8? A.? P. i/15; V. i/5; C.? 29 or 30 scales between the operculum and the hypural joint, and 12 in an oblique row from between the dorsal fins to the belly.

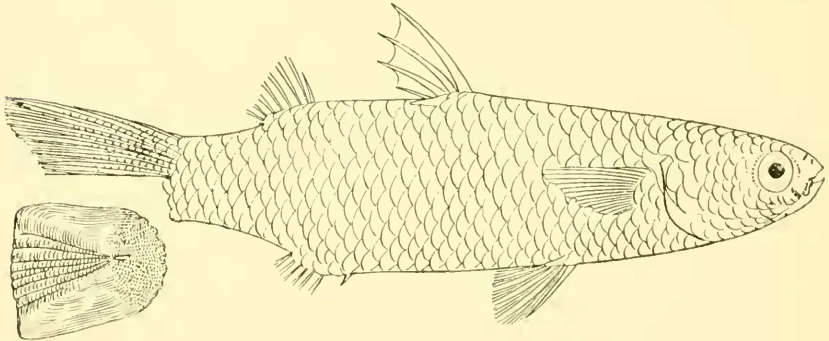


Fig. 1 - *Mugil dussumieri*, Cuvier & Valenciennes, Holotype of *M. stevensi*, Ogilby, with an enlarged figure of a scale from the middle of the side.

Maximum depth 3·7 in the length to the hypural joint, and a little greater than the length of the head which is 3·8 in the same. Orbit 3·5 in the head, and 1·3 in the bony interorbital width, which is 2·6 in the head. First dorsal spine 1·3 in the head.

Adipose eyelids well developed though rather narrow, the posterior broader than the anterior. Premaxillaries missing; one maxilla remaining which indicates that its end may have been exposed when the mouth was closed. Mandibles incomplete, their margins sparsely ciliated. Vomer and palatines toothless. Preorbital coarsely denticulate on its external and posterior margins. Exposed surfaces of all the scales finely rugose, scarcely any concentric rings being visible, and their edges are ciliated; those of the cheeks are rugose and ciliated also, and are arranged in five rows between the eye and the subopercular margin.

Dorsal spines very strong and long, the first inserted a trifle nearer the hypural joint than the anterior margin of the eye; its adpressed tip reaches much more than half the distance between its base and that of the last dorsal ray. Dorsal and anal fins very imperfect and entirely denuded of scales.

The specimen is bleached, and there is no trace of a dark axillary spot.

Length to the hypural joint 139 mm. Head $35\frac{1}{4}$ mm. Maximum depth between the dorsal fins 37 mm., but the specimen is evidently somewhat distorted. Orbit 10 mm., interorbit $13\frac{1}{2}$ mm., and first dorsal spine 26 mm.

Synonymy.—Ogilby noted the relationship of *M. stevensi* and *M. dussumieri*. Having critically compared his holotype with an Indian example of the latter species from Dr. Day's collection, I am unable to find any characters to separate the two; the differences noted by Ogilby prove to be very slight and insufficient to maintain his species. The depth is 3·7 in *stevensi* and 3·8 in *dussumieri*, and there is no appreciable difference in the forms of the snouts of the two. *M. dussumieri* has the upper jaw ciliated as was described by Ogilby, and the mandibles of the two specimens are similar. Odd scales remain on the snouts of both specimens and indicate no difference in this character. The eye is 3·5 in the head in *stevensi* and 3·8 in *dussumieri*, while an apparent difference in the interorbital width is due to the fact that Ogilby measured the interocular instead of the true interorbital space. The point of the insertion of the first dorsal spine is similar in the two specimens. Ogilby described the maxillaries as concealed; only a portion of one now remains which does not enable one to see whether it is concealed or not, but its end may well have been exposed when the mouth was closed as in *M. dussumieri*.

Ogilby included *M. dussumieri* in the synonymy of *M. subviridis*, but as his conclusions were based upon Day's descriptions of the typical specimens of both species, which were maintained as distinct by that author, further proof of their identity is necessary. The characters of both have been tabulated by Weber, (*loc. cit.*).

Localities.—The holotype of *M. stevensi* was taken at Gold Island, Rockingham Bay, Queensland, and the Indian example in the Australian Museum is from Madras. Stead has recorded *M. dussumieri* from the Clarence River estuary, New South Wales, but his identification was not altogether satisfactory and needs verification.

MUGIL TADOPSIS, Ogilby.

Brown-banded Mullet.

(Plate xxii., fig. 2).

Mugil tadopsis, Ogilby, Ann. Qld. Mus., No. 9, 1908, p. 27.

D. iv, $i/8$; A. iii/9; P. 16; V. $i/5$; C. 14. 29-31 scales between the operculum and the hypural joint, and 12 between the back and the belly before the first dorsal exclusive of the median dorsal and ventral rows.

Depth before the first dorsal fin 3·8 in the length to the hypural joint; head 4·5 in the same. Eye 4 in the head, slightly shorter than its distance from the premaxillary symphysis, and 1·7 in the interocular space, which is 2·4 in the head. Least depth of the caudal peduncle 1·6, second dorsal spine 1·5, and pectoral fin 1·2 in the head.

Lower profile of the head and body more strongly arched than the upper. Head slightly broader than deep. Snout rounded in the horizontal plane, its upper profile forming an almost straight oblique line with that of the head and fore part of the body to the origin of the dorsal fin. Upper lip almost vertical, each ramus about one-third as deep as long, with a row of minute ciliae on the edge; mandible very thin, without teeth, its rami meeting at a wide angle, and with a pit at the symphysis. Maxilla exposed when the mouth is closed, and reaching backward to slightly behind the vertical of the posterior nostril. Preorbital notched at the angle of the mouth, its inferior and posterior borders denticulated; its upper surface with a few scales. Adipose eyelids well developed but not encroaching upon the pupil. Cheek-scales in four rows below the eye, microscopically ctenoid and rugose exteriorly; those covering the preopercular margin are interrupted by several shallow naked mucous canals. Scales cover the snout almost to the margin of the lip, and extend over the mandible.

Body-scales microscopically ciliated, appearing cycloid to the naked eye. They are largest on the middle of the sides and smallest on the caudal peduncle; their free-edges are membranous but sculptured like the rest of the scale. No distinct axillary scales, but the exobasal scales of the ventral and first dorsal fins are well developed. The soft dorsal and anal fins are almost completely covered with scales, as are also the bases of the pectoral and caudal fins while small scales extend up between their rays.

First dorsal spine inserted nearer the snout than the hypural joint, and above the ninth or tenth body-scales; the second spine is longest but reaches less than half its distance from the middle of the second dorsal. Soft dorsal imperfect, originating above the nineteenth or twentieth body-scale; the space between the origins of the two dorsal fins is much greater than the length of the head. Anal imperfect, originating below the eighteenth body-scale and terminating behind the middle of the dorsal fin; its base is about one and two-thirds in its distance from the hypural joint. Pectoral fin reaching the seventh body-scale and terminating far in advance of the vertical of the first dorsal spine. Ventral inserted below the hinder third of the pectoral and very slightly nearer the snout than the origin of the anal; it reaches backward to below the third dorsal spine. Caudal imperfect, emarginate.

Brown after preservation in formaline, darker above, with traces of brown bands along each scale-row.

Described and figured from a specimen 264 mm. long to the end of the middle caudal rays, which has been definitely labelled by Ogilby as the type of the species. Its second dorsal, anal, and caudal fins are imperfect, so these have been completed in the figure from another specimen, in which also the colour-marking is as illustrated.

Affinities.—This species differs from *M. tale*, Forskal, as described and figured by Klunzinger¹ in having the dorsal and anal fins largely covered by scales. A comparison of the type with an Indian example of

¹ Klunzinger—Fische Roth. Meer. i., 1884, p. 131, pl. x., fig. 3.

M. plumeiceps, Cuv. & Val. (Day's Collection) which species has been united with *M. tade* by Klunzinger, shows that it has a much smaller and narrower head; it is shorter instead of longer than one-fourth of the length to the hypural, and the interocular space is less instead of more than twice the ocular diameter. *M. tadopsis* is very similar to *M. persia*, Buchanan, with small specimens of which I have compared it, but it has larger scales, there being 30 instead of 35 to the hypural joint and their surface sculpture is less developed than in the Indian species.

Localities.—Moreton Bay, Queensland; Type of *M. tadopsis*.

Burdekin River estuary, Queensland; Coll. A. Morton, 1883.

Endeavour River estuary, Queensland; Coll. A. R. McCulloch, 1918.

MUGIL GEORGI, Ogilby.

(Plate xxii., fig. 1).

Mugil georgii, Ogilby, Proc. Linn. Soc. N.S.Wales, xxii., 1897, p. 77. *Id.*, Waite, Mem. N.S.Wales Nat. Club, No. 2, 1904, p. 22. *Id.*, Stead, Ed. Fish. N.S.Wales, 1908, p. 43. *Id.*, Cockerell, Mem. Qld. Mus., ii., 1913, p. 53.

Mugil nortoni, Ogilby, Ann. Qld. Mus., No. 9, 1908, p. 22.

D. iv, i/8; A. iii/9; P. 15; V. i/5; C. 14. 31-32 scales between the operculum and the hypural joint, and 12 between the back and the belly before the first dorsal fin exclusive of the medium dorsal and ventral rows.

Depth before the first dorsal fin 3.4 in the length to the hypural joint; head 4 in the same. Eye 3.7 in the head, equal to its distance from the premaxillary symphysis, and 1.4 in the interorbital space, which is 2.8 in the head. Least depth of the caudal peduncle 1.9 in the head. First dorsal spine 1.9, second dorsal ray 1.7, and pectoral fin 1.1 in the head.

Upper and lower profiles of the head and body almost equally arched. Head deeper than broad. Snout rounded in the horizontal plane, its upper profile convex. Upper lip rather broad and vertical; a few very fine ciliae on the premaxillaries. Mandible very thin, without teeth, its rami meeting at an obtuse angle. Maxilla small, not quite reaching the vertical of the anterior orbital border, and completely hidden beneath the preorbital when the mouth is closed. Preorbital notched and denticulated on its anterior and posterior margins; its upper surface with a few scales. Adipose eyelids well developed but not encroaching upon the pupil. Cheek-scales finely ctenoid, arranged in five rows below the eye; small scales extend over the snout and mandible, and become larger and ciliated on the operculum.

Body scales obscurely ciliated, almost cycloid, but ctenoid on the breast. They are without membranous borders and are largest on the middle of the sides. Axillary scales well developed, reaching along one-third the length of the pectoral; the exobasal scales of the ventrals and spinous dorsal are also conspicuous. The bases of the pectoral and caudal fins are completely covered by scales which also extend up between the rays; a scaly sheath covers the base of the anal; and scales extend up between both the dorsal and anal rays but do not conceal them.

First dorsal spine inserted above the twelfth body-scale, and much nearer the hypural joint than the end of the snout; its first spine is a little longer than the second, but not quite so long as the second dorsal ray, and reaches half its distance from the base of the fourth dorsal ray. Soft dorsal originating over the twenty-second or twenty-third body-scale, emarginate; the space between the origins of the two dorsals equals the length of the head. Anal originating below the twentieth body-scale and terminating below the middle of the dorsal; its base is shorter than its distance from the hypural joint, and its margin is excavate. Pectoral fin reaching the tenth scale but not attaining the vertical of the dorsal origin. Ventrals inserted just behind the vertical of the middle of the pectoral and nearer the anal fin than the end of the snout; it reaches backward to below the middle of the first dorsal. Caudal fin emarginate, the lobes pointed.

Bleached after long preservation. A dark spot at the base of the pectoral, and the margin of the caudal fin blackish.

Described from the holotype of the species, 180 mm. long to the end of the middle caudal rays, which was presented to the Australian Museum by Mr. J. Douglas Ogilby. The accompanying figure represents a larger specimen 231 mm. long, from Port Hacking, in which the pectoral and ventral fins do not reach quite so far back as in the smaller holotype, and the anal is placed rather farther back in relation to the second dorsal.

Synonymy.—According to Mr. H. A. Longman, no specimen now in the Queensland Museum can be definitely identified as the type of *M. nortoni*, Ogilby, but an example 165 mm. long, which was incorrectly registered as *M. stervensi* by Ogilby, agrees sufficiently well with the description of *M. nortoni* to leave no doubt as to its identity with that species. I have been enabled to compare this with the holotype of *M. georgii* in the Australian Museum, and can find no characters to separate the two as distinct species.

Localities.—Gorges River estuary, Botany Bay, New South Wales: Holotype, coll. J. Douglas Ogilby, December, 1895.

Port Hacking, New South Wales: several specimens, presented by the Fisheries Branch, Chief Secretary's Department.

Karnah River estuary, Port Stephens, New South Wales: presented by the Fisheries Branch, Chief Secretary's Department.

Brisbane River estuary, Queensland: (cotype of *M. nortoni*?) Queensland Museum.

MUGIL LONGIMANUS, Günther.

Mugil longimanus, Günther, Brit. Mus. Cat. Fish., iii., 1861, p. 428. *Id.*, Steindachner, Denk. Akad. Wiss. Wien, xli. i., 1879, p. 5. *Id.*, Klunzinger, Sitzb. Akad. Wiss. Wien., lxxx. i., 1879, p. 395. *Id.*, Macleay, Proc. Linn. Soc. N.S.Wales, ix., 1884, p. 41. *Id.*, De Vis, Proc. Linn. Soc. N.S.Wales, ix., 1885, p. 870. *Id.*, Ogilby, Cat. Fish. N.S.Wales, 1886, p. 41. *Id.*, Kent, Gt. Barrier Reef, 1893, pp. 294, 370. *Id.*, Ogilby, Ann. Qld. Mus., No. 9, 1908, p. 26.

Mugil cunnesius, Day, Fish India, 1876, p. 349, pl. lxxiv., fig. 3. *Id.*, Waite, Mem. N.S.Wales Nat. Club, No. 2, 1904, p. 22 (Perhaps not *M. cunnesius*, Cuvier & Valenciennes).

Characters.—A specimen in the Australian Museum, 156 mm. long to the end of the middle caudal rays, from Bombay (Dr. Francis Day's Collection), agrees well with that author's figure quoted above. It differs from *Mugil georgii* in several striking characters: the first dorsal spine is inserted nearer the end of the snout than the hypural joint, the cheek-scales are cycloid instead of ctenoid, each body-scale has a membranous border, and the soft dorsal and anal fins are largely covered by scales. A second specimen from the Philippine Islands exhibits the same characters.

Australian Localities.—The only definite records of this species from Australian waters are those of Steindachner and Klunzinger, who recorded specimens from Cleveland Bay, Queensland. In recording Steindachner's reference, O'Shaughnessy, Zoological Record 1879, p. 14, unfortunately gave the locality as Port Jackson, which caused Ogilby to include the species in a List of Fishes of New South Wales. Waite later followed Ogilby, but accepting the synonymy quoted by Day, changed the name from *longimanus* to *cunnesius*. Ogilby has since endeavoured to prove that *longimanus* is not certainly known from Australian waters, and that Steindachner's and Klunzinger's specimens are identical with *M. nortoni* (= *M. georgii*), but no valid reason is apparent to support this supposition.

MUGIL, LIZA, ARGENTEUS, Quoy & Gaimard.

Flat-tailed Mullet.

Mugil argentens, Quoy & Gaimard, Voy. Uranie, 1825, p. 338, pl. lix., fig. 3.

Mugil peronii, Cuvier & Valenciennes, Hist. Nat. Poiss., xi., 1836, p. 138.

Mugil ferrandi, Cuvier & Valenciennes, *Tom. cit.*, p. 142—substitute name for *M. argentens*.

Synonymy.—Günther² included *M. argentens* in a section of the genus *Mugil* which is characterised by the possession of a well-developed adipose eyelid and only nine anal rays, whereas neither the original description nor the figure of the species indicated any such eyelid, and ten anal rays were definitely described. Günther's error has been followed by subsequent authors, and a tropical fish very different to that taken in Port Jackson by Quoy and Gaimard, has been associated with the name *argentens*. Quoy and Gaimard's description and figure were apparently based upon a young example of the common Flat-tailed Mullet, *Mugil peronii*, which name must give place to the earlier *argentens*.

Ogilby³ has united *Mugil crenideus*, Kner⁴ with *M. peronii*, but this is apparently incorrect. Kner described and figured nine anal rays instead of ten as in *M. peronii*, and 43-44 scales instead of 35-38. Kner's species is apparently synonymous with *Myrus elongatus*, Günther.

² Günther—Brit. Mus. Cat. Fish., iii., 1861, p. 424.

³ Ogilby—Proc. Linn. Soc. N.S.Wales, xxii., 1897, p. 79.

⁴ Kner—Novara Zool. i., 1865, p. 229, pl. ix., fig. 4.

MYXUS, Günther.

MYXUS ELONGATUS, Günther.

Myxus elongatus, Günther, Brit. Mus. Cat. Fish., iii., 1861, p. 466. *Id.*,
Waite, Tr. Roy. Soc. S. Austr., xl., 1916, p. 454, pl. xlv.

Mugil crepidens, Kner, Novara Zool., i., 1865, p. 229, pl. ix., fig. 4.

Myxus crepidens, Steindachner, Sitzb. Akad. Wiss. Wien, liii., 1866, p. 461.

Caestrus norfolcensis, Ogilby, Proc. Linn. Soc. N.S. Wales, xxii., 1897, p. 80.

Synonymy.—Steindachner has shown that *Mugil crepidens* is a species of *Myxus*, and I find nothing to distinguish it from *Myxus elongatus*. The identity of *Caestrus norfolcensis* and *M. elongatus* has already been published by Waite.

Family APOGONIDÆ.

Genus ADENAPOGON, *Gen. nov.*

First dorsal with six spines, anal with two; soft dorsal and anal each with about ten rays. Preopercular margin and inframarginal crest entire. Scales cycloid; lateral line complete, extending over about 26 scales. A band of villiform teeth in each jaw, without canines, and some minute teeth on the vomer; palatines with or without teeth. Gill-rakers slender and numerous, about twelve on the lower limb of the first gill-arch. Caudal emarginate, its peduncle shorter than the head. A silvery canal extends backwards on each side from the tongue to the caudal peduncle near the ventral surface. Otherwise as in *Apogon*.

Genotype.—*Apogon roseigaster*, Ramsay & Ogilby.

Affinities.—This genus differs from *Siphamia*, Weber⁵, in which a similar silvery canal is developed, in having cycloid instead of ctenoid scales; its preopercular margin also is smooth instead of serrated. In these characters it agrees with *Rhabdamia*, Weber⁶, but the silvery organ is wanting in that genus.

Weber has suggested (*Tom. cit.*, p. 244) that the silvery canal extending along each side of the body behind the anal fin in various Apogonids is an invagination of the peritoneum, which perhaps serves as a hydrostatic apparatus to enable deeper water species to ascend to shallower depths. In *A. roseigaster* and *A. woodi*, both of which occur in shallow water, this canal appears to have no connection with the body-cavity, but is continued forward to a thick gland which is situated at the base of the tongue, and appears to be a phosphorescent organ.

⁵ Weber—Siboga Exped., lvii., 1913, p. 243.

⁶ Weber—*Tom. cit.*, p. 240.

ADENAPOGON ROSEIGASTER, *Ramsay & Ogilby*.

(Plate xxi, fig. 2).

Apogon roseigaster, Ramsay & Ogilby, Proc. Linn. Soc. N.S.Wales (2), i., 1886, p. 1101. *Id.*, Ogilby, Proc. Roy. Soc. Qld., xxi., 1908, p. 24.

Amia roseigaster, Stead, Proc. Linn. Soc. N.S.Wales, xxx., 1905, p. 481.

Br. 7; D. vi, i/10 (11); A. ii/10 (11); P. 14; V. i/5; C. 17. L. lat. 26; l. tr. 1, 1, 5.

Depth 2.9 in the length to the hypural joint; head 2.6 in the same. Diameter of the eye 3.8 in the head, longer than the snout, and a little greater than the interorbital width; snout 4.7, interorbital space 4 in the head. Second dorsal ray 1.9 in the head, and a little longer than that of the anal; caudal peduncle 1.6 in the head.

Snout obtuse, the jaws subequal. Nostrils large, with a short interspace between them; the anterior with a low membranous border. Maxilla broad, naked, its hinder angle reaching beyond the vertical of the middle of the eye. Both the preopercular margin and the inframarginal crest are entire; opercular border membranous, without spines. A narrow band of villiform teeth in each jaw; vomer with a few microscopic teeth or smooth, palatines and tongue smooth. Gill-rakers slender, fourteen on the first gill-arch, those at the hinder angle about half as long as the eye.

A thick silvery gland with a black upper surface is situated on each side of the base of the tongue, from which a broad silver canal extends backward on each side of the isthmus to the breast; it expands over the base of the pectoral and covers the lower portion of the abdomen, and thence runs backward above the base of the anal fin to a short distance before the hypural joint. It is sharply defined, largely by a blackish line, and is perhaps an elaborate phosphorescent organ.

Head largely covered by membrane which is permeated by canals and pores; it extends backward on the neck to the fourth scale before the dorsal fin. Operculum with about five large cycloid scales. Body-scales cycloid; they extend over the base of the caudal fin, but the other fins are naked. Lateral line parallel with the back, and extending onto the base of the caudal fin.

First dorsal fin rounded, the third spine longest. Second ray of soft dorsal highest and much longer than the third dorsal spine; the edge of the fin is slightly emarginate. Anal has its origin and termination a little behind the same points of the second dorsal, but is similar to that fin in form. Pectorals rounded, the fourth ray longest and reaching the vertical of the anal origin. Ventrals inserted in advance of the pectorals, and not nearly reaching the vent. Caudal emarginate.

Colouration almost uniform after preservation; a few brown spots on the head form a bar across the snout and a less definite one across the cheek. Each dorsal fin with a broad brown band crossing its lower half; a similar band may be present on the anal.

Described and figured from a specimen 62 mm. long to the end of the middle caudal rays, from the Clarence River estuary, which is well

preserved though it has lost all its scales. These are preserved in a smaller example from the Parramatta River estuary, which was collected by Mr. J. Douglas Ogilby in 1886, and has served to complete the description and figure.

Habits.—Ogilby recorded that this species was plentiful in the Parramatta River estuary, numbers being obtainable any morning in the fish market among prawns from that locality. It is also commonly secured by net fishermen on the zosteria flats around Port Jackson. Stead recorded that the species, like many others of the family, carries its eggs in the mouth until they hatch. A specimen in the Australian Museum has the mouth crammed with eggs, each of which is as large as the pupil of the eye, and many others are hanging outside the jaws.

Localities.—A number of specimens are in the Australian Museum from Port Jackson, and two from the Clarence River estuary. Ogilby has recorded the species from the estuary of the Brisbane River, Queensland, where it is abundant.

ADENAPOGON WOODI, *sp. nov.*

(Plate xxi., fig. 3).

Br. 7; D. vi, 1/8; A. ii/8; P. 12; V. 1/5; C. 17. L. lat. about 25.

Depth 3·8 in the length to the hypural joint; head 2·7 in the same. Diameter of the eye 3·5 in the head, longer than the snout, and a little greater than the interorbital width; snout 4·6, interorbital space 3·7 in the head. Second dorsal ray 2·2 in the head and a little longer than that of the anal; caudal peduncle 1·4 in the head.

Snout conical, the lower jaw projecting. Nostrils large, separated by a narrow interspace; the anterior with a low membranous border. Hinder angle of the maxilla somewhat produced, reaching the vertical of the middle of the eye. Both the preopercular margin and the infra-marginal crest are entire; operculum membranous, its spines rudimentary. A narrow band of villiform teeth in each jaw, and microscopic teeth are present on the vomer and palatines; tongue smooth. Gill-rakers slender, fourteen on the lower limb of the first arch; those at the hinder angle are about half as long as the eye. A thick silvery gland on each side of the base of the tongue, from which a silver band extends backward to near the hypural joint as in *A. roseigaster*.

Head largely covered by a membrane which extends backward onto the neck, and is permeated by canals and pores. A single scale at the origin of the lateral line is cycloid; all the others are missing, but the scale-pits indicate that there were about 25 on the lateral line.

First dorsal rounded, the third spine longest. Second dorsal rounded, the second ray longest, and much longer than the third spine; most of the rays are bifurcate. Anal rounded, its origin and termination behind the same points of the second dorsal. Pectoral very small, rounded, the fourth ray longest but not nearly reaching the vertical of the vent. Ventrals inserted in advance of the pectorals and not quite reaching the vent when adpressed. Caudal emarginate.

Colour.—Brown in alcohol, profusely speckled with dark dots which form darker patches at the bases of all the vertical fins; they also form an oblique bar across the cheek, and one before the eye. The silver band is dotted with black and is sharply defined by blackish borders. Eyes, cheeks, lower portion of operculum, and sides of abdomen silvery. Fins with a few scattered dark dots.

Described and figured from a specimen 44 mm. long to the end of the middle caudal rays.

Affinities.—The differences between this species and *A. roseigaster* are expressed in the following key.

- a. Depth greater than one-third of the length; palatines toothless; pectoral reaching the vertical of the anal origin; dorsal and anal fins each with ten rays, their margins subtruncate*roseigaster*.
- aa. Depth less than one-third of the length; palatines with teeth; pectoral not nearly reaching the vertical of the vent; dorsal and anal fins each with eight rays, their margins rounded*woodi*.

That *A. woodi* is not the young form of *A. roseigaster* is proved by the fact that I have several specimens of the latter which are much smaller than some of my examples of *A. woodi*, and exhibit the distinguishing characters noted above. Neither is it a sexual form, since a series of numerous specimens of *A. woodi* include examples with both milts and roes.

Breeding.—Several males about 40 mm. long, have their mouths filled with a number of large eggs in more or less advanced stages of development. Some females have the body-cavity greatly distended with a large number of eggs ready for extrusion, each of which is about as large as the pupil of the eye.

This species is named after Mr. A. W. Wood, officer in charge of the Fisheries Branch, Chief Secretary's Department, through whose interest a large collection was transferred from his department to the Australian Museum. It included a fine series of this interesting species.

Localities.—Over fifty examples, 37-49 mm. long, are in the Australian Museum from Rose Bay, Port Jackson, and Port Hacking, New South Wales, which were collected by Mr. David G. Stead. A single specimen from Queenscliff, Victoria, was collected by Mr. Edgar R. Waite.

Family LABRIDÆ.

Genus PSEUDOLABRUS, Bleeker.

A fine series of specimens collected in New Zealand by Mr. Charles Hedley, enables me to supplement my earlier notes⁷ upon several species which have been recorded from Australian waters.

⁷ McCulloch—Rec. Austr. Mus., ix., 3, 1913, p. 361.

PSEUDOLABRUS CELIDOTUS, Forster.

Pseudolabrus celidotus (Forster) McCulloch, Rec. Austr. Mus., ix, 3, 1913, p. 375.—Synonymy and references.

Nine well preserved specimens, 175-255 mm. long, are separable into the two forms *celidotus* and *bothryocosmus* as figured by Richardson⁸. Four are referable to *celidotus* and five to *bothryocosmus*, but one of the latter has the characteristic lateral blotch of *celidotus* faintly indicated in addition to its own colour-markings. Since all the specimens were taken at the one locality, I follow Waite⁹ in regarding them as variations of the one species.

The two forms exhibit the following distinctive colour-marking.—

- A large dark blotch on and below the lateral line behind the pectoral fin. Upper surface of the head usually spotted; a dark stripe passes from the middle of the preorbital to the eye, behind which are two lines extending backwards. Soft dorsal usually with oblique series of dark stripes and spots, which may expand into larger irregular spots. Anal with dark spots, and an indefinite medium stripe*celidotus*.
- Several scales between the lateral line and the middle of the back with irregular blackish spots. Upper surface of the head plain; a sinuous stripe passes from the lower part of the preorbital towards and under the eye. Soft dorsal usually with a more or less distinct darker horizontal stripe; a dark median stripe along the anal*bothryocosmus*.

Loc.—Portobello, Port Chalmers, New Zealand; 7th-13th December, 1918. In the seine and by hook and line.

PSEUDOLABRUS MILES, Bloch & Schneider.

Labrus miles, Bloch & Schneider, Syst. Ichth., 1801, p. 264, and *L. coccineus*, Forster, MS.

Julis? rubiginosus, Richardson, Ann. Mag. Nat. Hist., xi., 1843, p. 425.

Labrichthys psittaculus, Hutton, Cat. Fish. N.Zeal., 1872, p. 43, and Tr. N.Z. Inst., v., 1873, p. 265, pl. x., fig. 69, and *Loc. Cit.*, ix., 1877, p. 354. (Not of Richardson).

Labrichthys roseipunctatus, Hutton, Tr. N.Z. Inst., xii., 1880, p. 455.

Pseudolabrus coccineus, Waite, Rec. Canth. Mus. i. 3, 1911, p. 224, pl. xlvi.

Three specimens 220-290 mm. long, exhibit the characters described and figured by Waite. Their pink colouration is, however, much more delicate than the somewhat unfinished illustration indicates.

Loc.—Secured by line fishing off Cape Saunders, near Port Chalmers, New Zealand; 17th Dec., 1918.

⁸ Richardson—Ichth. "Erebus & Terror," i., 3, p. 53, pl. xxxi.

⁹ Waite—Rec. Canth. Mus., i., 3, 1911, p. 224.

PSEUDOLABRUS PSITTACULUS, *Richardson*.

- Labrus psittaculus*, Richardson, Proc. Zool. Soc., 1840, p. 26, and Trans. Zool. Soc., iii., 1849, p. 141. *Id.*, Richardson, Ichth. "Erebus & Terror," 1848, p. 129, pl. lvi., fig. 7-10.
- Labrichthys psittaculus*, Günther, Brit. Mus. Cat. Fish., iv., 1862, p. 114; *Id.*, Castelnau, Proc. Zool. Soc. Vict., ii., 1873, p. 52; *Id.*, Macleay, Proc. Linn. Soc. N.S.Wales, vi., 1881, p. 79; *Id.*, Johnston, Proc. Roy. Soc. Tasm., 1882 (1883), p. 124, and *Loc. Cit.*, 1890 (1891), p. 35; *Id.*, Lucas, Proc. Roy. Soc. Vict. (2), ii., 1890, p. 32.
- Labrichthys rubicunda*, Macleay, Proc. Linn. Soc. N.S.Wales, vi., 1881, p. 89.
- Labrichthys mortoni*, Johnson, Proc. Roy. Soc. Tasm., 1884 (1885), p. 256.
- Pseudolabrus psittaculus*, McCulloch, Zool., Res. Endeavour, i. 1, 1911, p. 77, fig. 19.
- Pseudolabrus miles*, McCulloch, Rec. Austr. Mus., ix., 3, 1913, p. 372. (Not of Bloch & Schneider).

This species is quite distinct from *P. miles*, Bloch & Schneider, with which it has been confused. It has only three or four series of cheek-scales instead of about six, which become uniserial instead of biserial behind the eye. Comparing examples of both species of similar size, the eye of *P. psittaculus* is seen to be smaller in relation to both the inter-orbital space and the length of the snout. *P. miles* has a broad brownish-violet band across the base of the tail which is wanting in *P. psittaculus*, and the outer borders of that fin are darker instead of uniform with the rest. *P. psittaculus* has often some dark spots at the base of the posterior dorsal rays and on the caudal peduncle which are wanting in *P. miles*.

P. psittaculus is known from southern Australia and Tasmania. Hutton's identifications of the species from New Zealand evidently refer to *P. miles*. (See *ante*).

Family ISTIOPHORIDÆ.

Genus ISTIOPHORUS, *Lacépède*.ISTIOPHORUS GLADIUS, *Bronssonet*.

Sail Fish.

(Plate xxiv., fig. 1).

- Scomber gladius*, Broussonet, Mem. Acad. Sci., 1786, p. 454, pl. x.
- Istiophorus gladius*, Lacépède, Hist. Nat. Poiss., iii., 1802, p. 374.
- Istiophorus indicus*, Cuvier & Valenciennes, Hist. Nat. Poiss., viii., 1831, p. 293, pl. cxxix. *Id.*, Valenciennes, Regne Anim. Illustr. Poiss., 1836-49, p. 124, pl. liii., fig. 1.

Histiophorus gladius, Günther, Brit. Mus. Cat. Fish., ii., 1860, p. 513. *Id.*, Day, Fish, India, pt. 2, 1876, p. 198. *Id.*, Castelnau, Proc. Linn., Soc., N.S.Wales, iii, 1879, p. 352. *Id.*, Macleay, Proc. Linn. Soc., N.S.Wales, v., 1881, p. 522. *Id.*, Goode, Rept. U.S. Fish Comm., 1880 (1883), p. 309, pl. viii. *Id.*, Ogilby, Cat. Fish. N.S.Wales, 1886, p. 25.

Istiophorus gladius, Stead, Proc. Linn. Soc. N.S.Wales, xxxvi., 1911, p. 44.

D. 46/7; A. 12/6; P. 18; V. i/2. Branchiostegals 7.

Depth at the base of the anterior dorsal rays and excluding the dorsal sheath 1·7 in the length of the head from the tip of the mandible to the opercular margin, and about 7·7 in the length from the end of the mandible to that of the middle caudal rays; depth before the anterior anal fin 2·4, and of the caudal peduncle 6·4 in the head measured as above. Eye 9·7 in the head and 1·7 in the interorbital width, which is 5·5 in the head. Rostrum (incomplete) 2·1 as long as the rest of the head. Pectoral 1·3 in the head. Highest dorsal rays subequal in length to the head from the end of the rostrum to the opercular margin.

Rostrum straight, subcylindrical distally, though a little broader than deep; its upper surface is smooth, but the sides and lower surface are covered anteriorly with spinules which extend backward on each side in a gradually narrowing row to below the middle of the eye. Maxilla a thin and rather narrow plate which is obtusely pointed posteriorly, and reaches backward beyond the posterior margin of the eye. Mandible pointed, the symphysis forming a subcylindrical bone like the rostrum; its upper surface is covered with similar spinules which extend backward on the sides to below the anterior portion of the eye. No teeth on the palate, but minute spinules are present on the soft membrane between the symphysis of each jaw. Nostrils small and close together, situated a little before the upper portion of the eye, and separated by a small rounded lobe. Preopercular edge thin and almost entire, the angle somewhat rounded. Operculum, unarmed, with a rounded membranous edge. Gill-membranes free and broadly united across the isthmus. Gill-arches smooth, without gill-rakers. Four gills, a slit behind the fourth; pseudobranchiae well developed.

Body slender and compressed, broadest anteriorly and becoming gradually narrower backwards. A broad fleshy fold on each side of the back forms a sheath to accommodate the anterior dorsal fin, and similar folds along the ventral edge as far as the vent form a sheath for the ventral rays; the anterior anal fin is also provided with a sheath, but the bases of the second dorsal and anal are uncovered. The entire surface of the body is beset with elongated pointed scales which are shortest and broadest on the dorsal surface but become very long and slender on the abdominal region. Lateral line elevated into a low peak above the base of the pectoral fin, after which it quickly descends to the middle of the body and extends backward in a straight line to the tail. Caudal peduncle deeper than broad; two small keels on each side of the base of the tail which converge slightly backwards.

First dorsal fin commencing a little behind the vertical of the preopercular margin, and formed of flexible rays united by a leathery membrane. Its first three rays are short though increasing in length successively; the fourth forms the anterior margin of the fin and is longer than the five following it; thence the rays increase more or less regularly in length to the twenty-second, which is the longest of all; after this they decrease again, and form a rounded though somewhat uneven margin to the fin; the fifth to the eleventh rays and the fifteenth are bifurcate, but all the others are simple. A short space separates the two dorsals. Second dorsal formed of branch rays; the first is longer than those following it, but shorter than the last which is prolonged and thickened. Second anal similar to and opposite the second dorsal. Third ray of the anterior anal longest and simple, and inserted nearer the base of the tail than that of the pectoral fin; it is followed by several branched rays, after which the others are simple. Pectoral falcate, the upper ray longest and broader than the others. Ventrals broken; each is formed of one spine and two flattened rays, all closely in contact. Caudal greatly forked, with a thick muscular base which largely covers the median rays.

Colour-marking.—The specimen has become greatly stained during preservation but the upper portion appears to have been uniformly dark coloured and the lower lighter. The anterior dorsal fin is uniformly black.

Described and figured from a specimen about 6 feet $8\frac{1}{2}$ inches long over all. It has been cut into three sections and the end of the rostrum is broken off, so that its exact length cannot be determined, but it measures approximately 1570 mm. from the end of the lower jaw to the tips of the middle caudal rays.

Locality.—This specimen has been presented to the Trustees of the Australian Museum by the Fisheries Branch, Chief Secretary's Department. It is unfortunately without data, but Mr. Stead informs me that it is the example recorded by him (*Loc. cit.*), from Port Stephens. A dorsal fin which was supposed to have been taken in New South Wales waters by Dr. Bennett was identified as belonging to *I. gladius* by Günther.

Family GEMPYLLIDÆ.

Genus THYRSITES, Cuvier.

THYRSITES ATUN, Euphrasen.

(Plate xxiv., fig. 2).

Barraconta.

Thyrsites atun (Euphrasen) Cuvier & Valenciennes, Hist. Nat. Poiss., viii., 1831, p. 196, pl. cccix. *Id.*, Günther, Brit. Mus. Cat. Fish., ii., 1860, pp. 350, 527.

D. xx/12/5; A. 12/6; P. 14; V. i/5; C. 17. Depth before the ventral fins 7.6 in the length to the hypural joint; head 4.02 in the same. Eye 1.2 in the interorbital space, 2.7 in the snout, and 6.5 in the head; interorbital width 5.2, and snout 2.3 in the head. Fifth dorsal spine 3.0, third dorsal ray 3.2, and pectoral fin 2.2 in the head; length of the ventral fins subequal to the interorbital width.

Body elongate and strongly compressed. Upper profile of the head forming an oblique line from the snout to the origin of the dorsal fin. Premaxillary symphysis pointed, the mandible projecting well beyond it; interorbital space flat. Maxilla reaching a little beyond the vertical of the anterior ocular margin; its hinder margin is rounded, and there is an oblique groove behind it. Nostrils widely separated, situated in a shallow depression on the side of the snout. Preopercular border membranous, only the rounded angle and the lower edge free. Opercular bones thin and unarmed; a deep incision in the opercular edge is covered with membrane.

Each premaxillary with a single row of compressed teeth which are smallest anteriorly; mandibles with similar but larger and widely spaced teeth. Three large compressed teeth at the symphysis of the upper jaw, and one very small tooth on each side of the vomer; a row of small teeth on each palatine.

Entire body covered with small and very thin cycloid scales which are very deciduous. They are also present on the head, commencing above and between the nostrils, and extending to the edges of all the opercles. Minute scales are also present on the maxilla, but the snout and mandible are naked. Indications of minute scales remain on the anterior rays and base of the soft dorsal, and on the greater part of the caudal fin. Lateral line commencing above the operculum, and running parallel with the back to below the fifteenth dorsal spine; thence it curves sharply downward to the middle of the body, along which it makes a sinuous course to the hypural joint.

Dorsal fin originating a little before the vertical of the opercular edge; the spines increase slightly in length to the fifth, after which they decrease regularly to the last; a short interspace separates the spinous and soft dorsals. Third dorsal ray but little shorter than the fifth spine, and not quite reaching the base of the last when adpressed. Anal fin originating a little behind the vertical of the first dorsal ray; its third ray is as long as that of the dorsal, and is equal to the basal length of the fin. Pectoral pointed, the third upper ray longest. Ventral small, inserted well behind the base of the pectoral; the last ray is united with the abdomen by membrane. Caudal deeply forked.

Colour.—Steel blue on the back, brilliant silver on the sides and lower surface. Membrane of spinous dorsal largely black, the spines and basal parts white. Soft dorsal and pectoral margins blackish. Eye pale golden.

Described and figured from a specimen 450 mm. long to the end of the middle caudal rays, which was captured near Sydney, and presented to the Australian Museum by Mr. A. W. Wood, officer in charge of the Fisheries Branch, Chief Secretary's Department.

Variation.—A small example, 176 mm. long to the end of the middle caudal rays, is very similar to the specimen described, differing only in some of its proportions. The depth is 8.1 in the length to the hypural joint, and the head is 3.7 in the same. The eye is 5.5 in the head, and is wider than the interorbital space. It has six dorsal finlets, which number is more usual than five as described above.

Distribution.—*T. atun* was originally described from South Africa, and is also recorded from South America. It is plentiful in New Zealand, Tasmania, and Victoria, and ranges northward on the coast of New South Wales to beyond Port Jackson. It also occurs in South Australia, but has not yet been recorded from the West.

Family OGCOEPHALIDÆ.

Genus HALIEUTAEA, *Cuvier & Valenciennes*.

HALIEUTAEA BREVICAUDA, *Ogilby*.

Halieutaea brevicauda, *Ogilby*, New Fish. Qld. Coast, 1911, p. 138. *Id.*, *McCulloch*, Biol. Res. Endeavour, ii. 3, 1914, p. 163, pl. xxxiii.

Variation.—Three specimens 111, 133, and 147 mm. long differ from the holotype of the species, which is only 106 mm. long, in several details. Though the larger spines on the back and lateral margins are similarly arranged in all, the smaller spines are rather less numerous than in the holotype, and are almost wanting in the median sized specimen. The microscopic spinules covering the ventral surface are not very evident in the smallest specimen, but they are easily detected everywhere in the largest example. Two specimens agree with the holotype in having only four dorsal rays, but the other has five. The pectorals of the holotype have each a darker cross-band which is replaced by a broad marginal band in one specimen and is wanting in the others; the posterior portion of the caudal fin is dark grey; the back is ornamented with greyish-brown dots which form two irregular, but symmetrically placed, elongate rings, one of which extends down each side of the back and the other from the eye to the base of the pectoral.

These three specimens are so very similar, however, that I regard the above differences as mere individual variations.

Localities.—Off Cape Moreton, Queensland; 73 fathoms. Holotype.
Off Wata Mooli, New South Wales; 68 fathoms.
Off Bay of Fires, Tasmania; 45 fathoms.

Family DIODONTIDÆ.

Genus ALLOMYCTERUS, *gen. nov.*

Near *Dicotylichthys*, having a bifid nasal tentacle without openings, but all the spines are three-rooted and fixed. The greater part of the forehead is naked, and the dorsal and anal fins have each about sixteen rays. The bifid nasal tentacle and increased number of dorsal and anal rays distinguishes this genus from *Chilomycterus*.

Type.—*Diodon jaculiferus*, *Cuvier*.

ALLOMYCTERUS JACULIFERUS, *Cuvier*.

(Plate xxxiii., fig. 2).

Diodon jaculiferus, *Cuvier*, Mem. Mus. Hist. Nat., iv., 1818, p. 130, pl. vii. *Id.*, *Kaup*, Arch. Naturg., xxi. i., 1855, p. 229.

Chilomycterus jaculiferus, *Günther*, Brit. Mus. Cat. Fish., viii., 1870, p. 313. *Id.*, *Hutton*, Cat. Fish. N.Zeal., 1872, p. 73, and Trans. N.Zeal. Inst., v., 1873, p. 271. *Id.*, *Castelnau*, Proc. Zool. Soc. Viet., i., 1872, p. 211. *Id.*, *Macleay*, Proc. Linn. Soc. N.S.Wales, vi., 1881,

p. 345. *Id.*, Johnston, Proc. Roy. Soc. Tasm., 1882 (1883), p. 136, and 1890 (1891), p. 38. *Id.*, Lucas, Proc. Roy. Soc. Vict. (2), ii., 1890, p. 42. *Id.*, Waite, Mem. Austr. Mus., iv., 1, 1899, p. 98. *Id.*, Woodward, W. Austr. Year-book, 1900-1 (1902), p. 272.

Dicotylichthys jaculiferus, Waite, Mem. N.S. Wales Nat. Club, No. 2, 1904, p. 58, and Rec. Cantb. Mus., i., 1907, p. 34.

D. 16; A. 16; P. 20; C. 9. Length of the head to the gill-opening 3.0 in the length to the hypural joint. Length of the eye a little greater than the width of the gill opening, 4 in the head. Eye 2.4 in the interorbital space, which is 1.6 in the head. Highest dorsal rays a little longer than those of the anal, 1.7 in the head.

The snout, chin, and central portion of the interorbital area are naked. A spine is present above the antero-superior angle of each orbit, and one or two near the postero-superior margin; a large one is placed above the middle of each eye which is nearer the orbital margin than the median line of the head. A spinule is present between the eye and the angle of the mouth, and two others may be present under and behind the eye. Five spines form a row between the occiput and the base of the dorsal fin, and a longer one is present on each side of the caudal peduncle just behind the dorsal. An elongate, two-rooted spine behind the pectoral fin is the only movable spine of the body. Abdominal spines smaller than those of the back, and becoming still smaller as they approach the sides of the head.

Eye much shorter than its distance from the premaxillary symphysis. Interorbital space broad and flat. Nasal tentacle consisting of two flat lobes, a little nearer the eye than the end of the snout. Gill opening vertical, almost as wide as the eye.

Dorsal fin large, its anterior margin rounded, the posterior subtruncate, the junction of the two forming an obtuse angle. Anal placed a little farther back than the dorsal, its margin rounded. Hinder margin of pectoral somewhat emarginate unless greatly expanded, the second and third rays a little prolonged. Caudal rounded.

Colour.—Back and upper portion of sides olive-grey in life, with large black spots around the bases of some of the spines. An olive and yellow blotch between the eye and the gill-opening. A large black blotch behind the pectoral fin, and the spines surrounding it have bright yellow bases. An indefinite olive and yellow blotch on the middle of the sides below the origin of the dorsal fin. Sides and belly tinged with olive; eye olive.

Described and figured from a specimen 254 mm. long from off Botany Bay, New South Wales, which is similar in all details to the specimen recorded from New South Wales by Waite.

Distribution and Localities.—This species is common in Tasmanian waters, according to Johnston, and has been recorded from Victoria by Castelnau. Waite recorded a single specimen from 29-48 fathoms off Broughton Island, New South Wales, and the species is not uncommonly taken by trawlers in similar depths on the coast near Sydney. It has been recorded from Western Australia by Woodward, and I have examined a large dried skin which was obtained at Normalup Inlet on the south-western coast.

The species is common in New Zealand waters according to Hutton.